Characteristics of groundwater discharge along coastal line in Jakarta

- aspects from ^{222}Rn monitoring -

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Special thanks to Robert, Hendrar, Ramli,
and all Japanese & Indonesian members!

What coastal sub-group have done before

- Estimation of SGD flux using seepage-meter
- Understanding of SGD by Resistivity monitoring
- CTD monitoring along coastal line

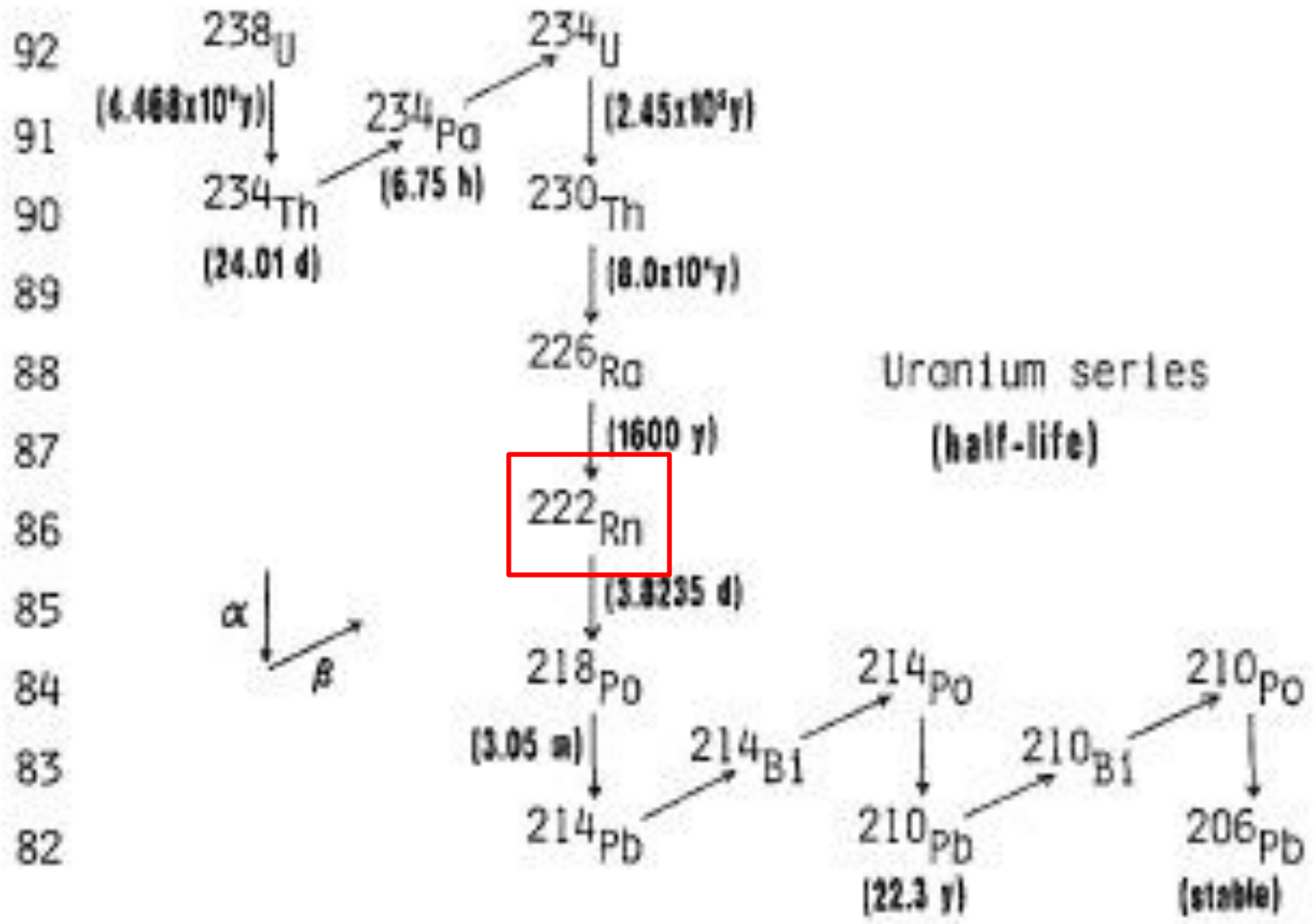
however

- The data in limited area
- Snapshot of situation
- Difficulty to distinguish river water & groundwater

Objectives

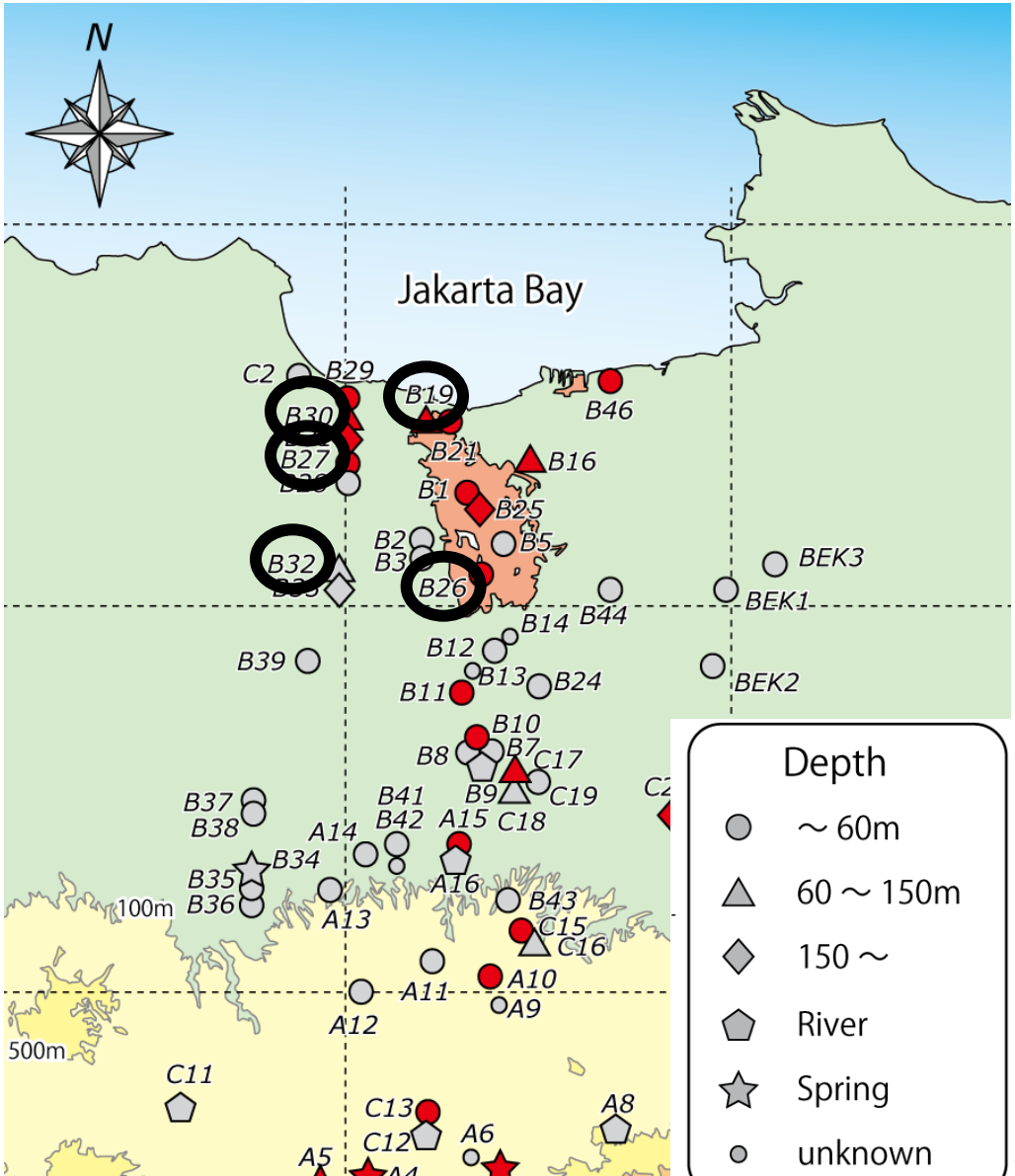
- To correctly estimate actual fresh-groundwater flux
- To better understand spatial variation of SGD in wide areas which cover whole Jakarta city

Rn is good indicator of groundwater



Decay chain of Uranium series radio nuclides

^{222}Rn in groundwater & river water in Jakarta

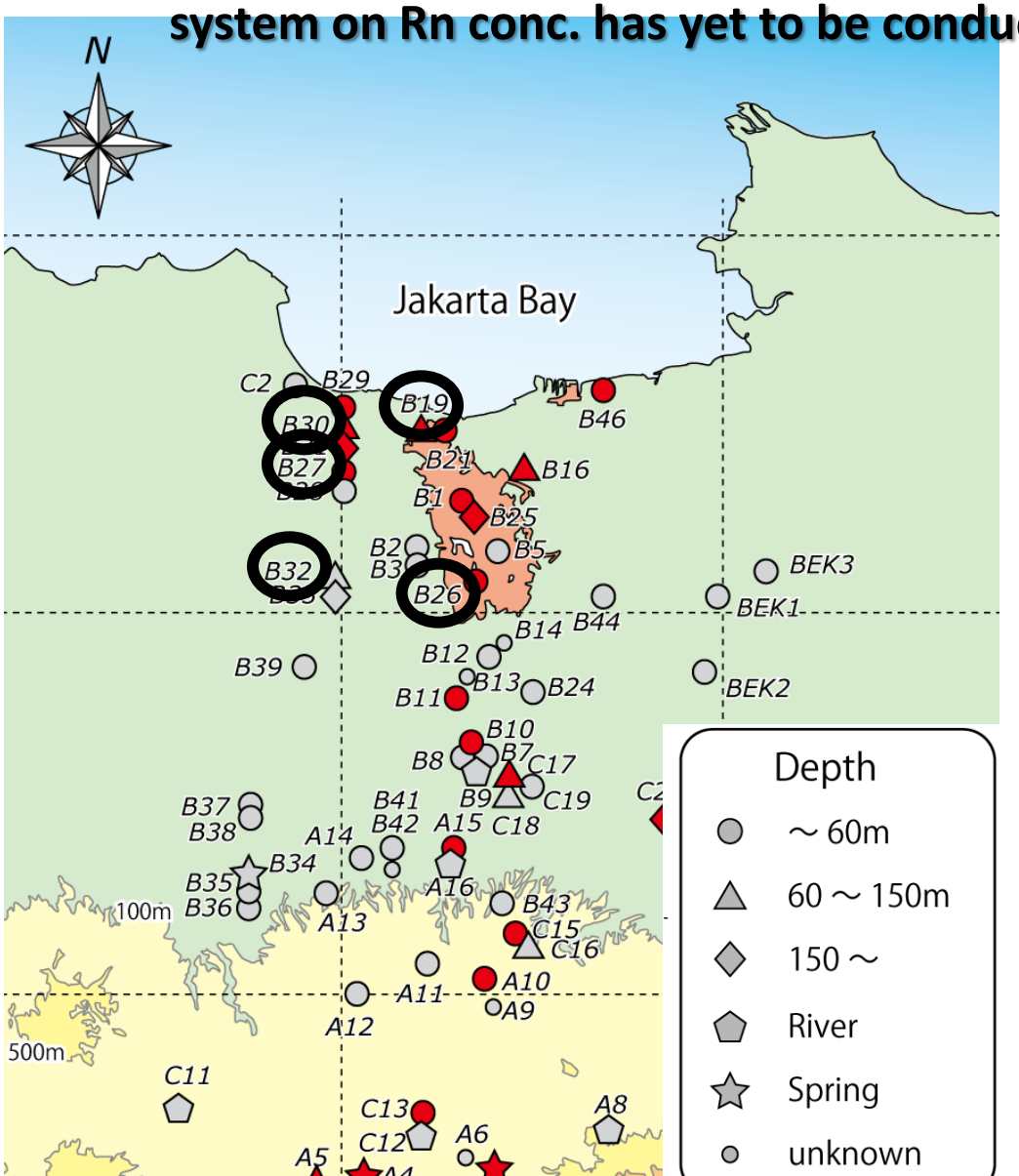


- A17
- B19
- B21
- B26
- B27
- B30
- B32
- JAKD2
- JAKD3
- Ciliwung Riv. (Dukuh Atas)

Batch measurement of Rn-222 in each groundwater sample

Rn-222 in groundwater & river water in Jakarta City

Attention: Correction of the effects of the inner volume of the analytical system on Rn conc. has yet to be conducted. This is just raw data.

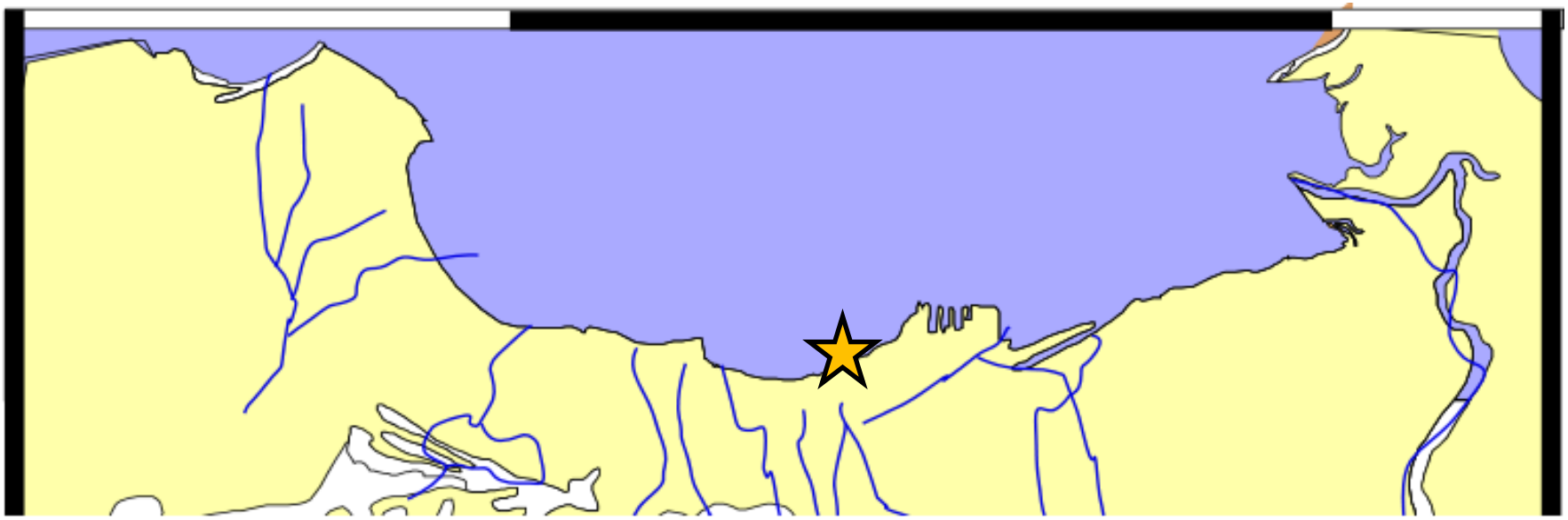


A17	3.4×10^5
B19	5.9×10^3
B21	1.3×10^4
B26	7.8×10^4
B27	7.0×10^3
B30	5.8×10^4
B32	2.6×10^4
JAKD2	2.3×10^5
JAKD3	8.0×10^4
Ciliwung Riv. (Dukuh Atas)	7.3×10^3

dpm/m^3

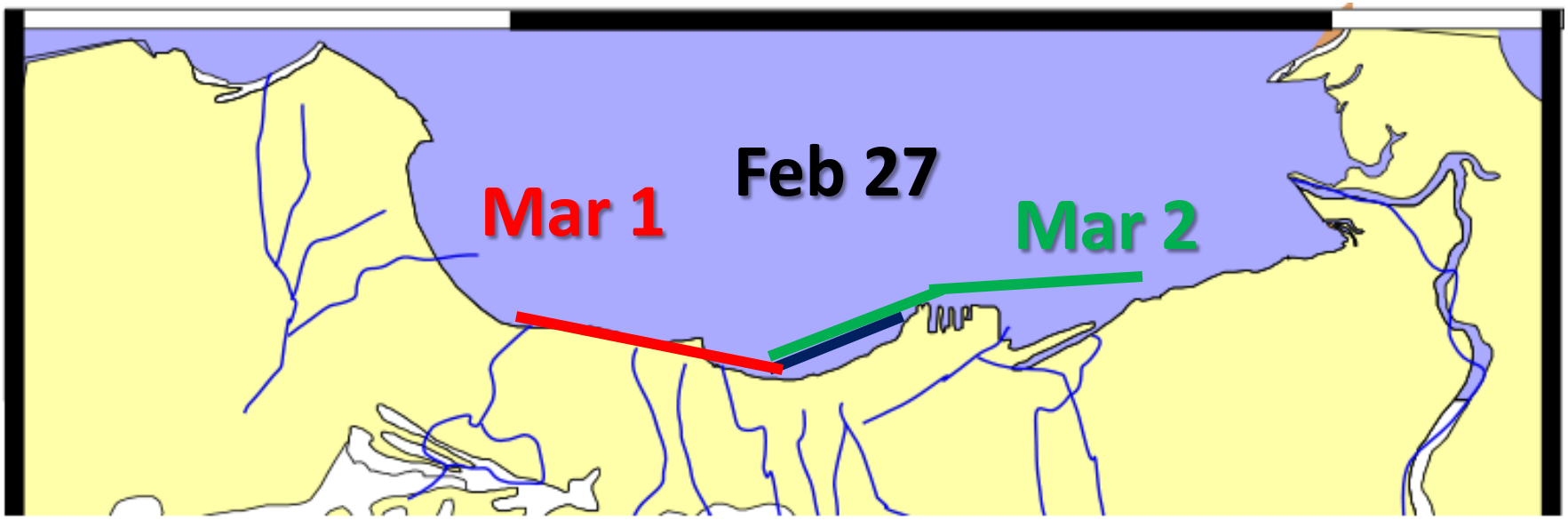
Study Site

Time-series monitoring of Rn-222

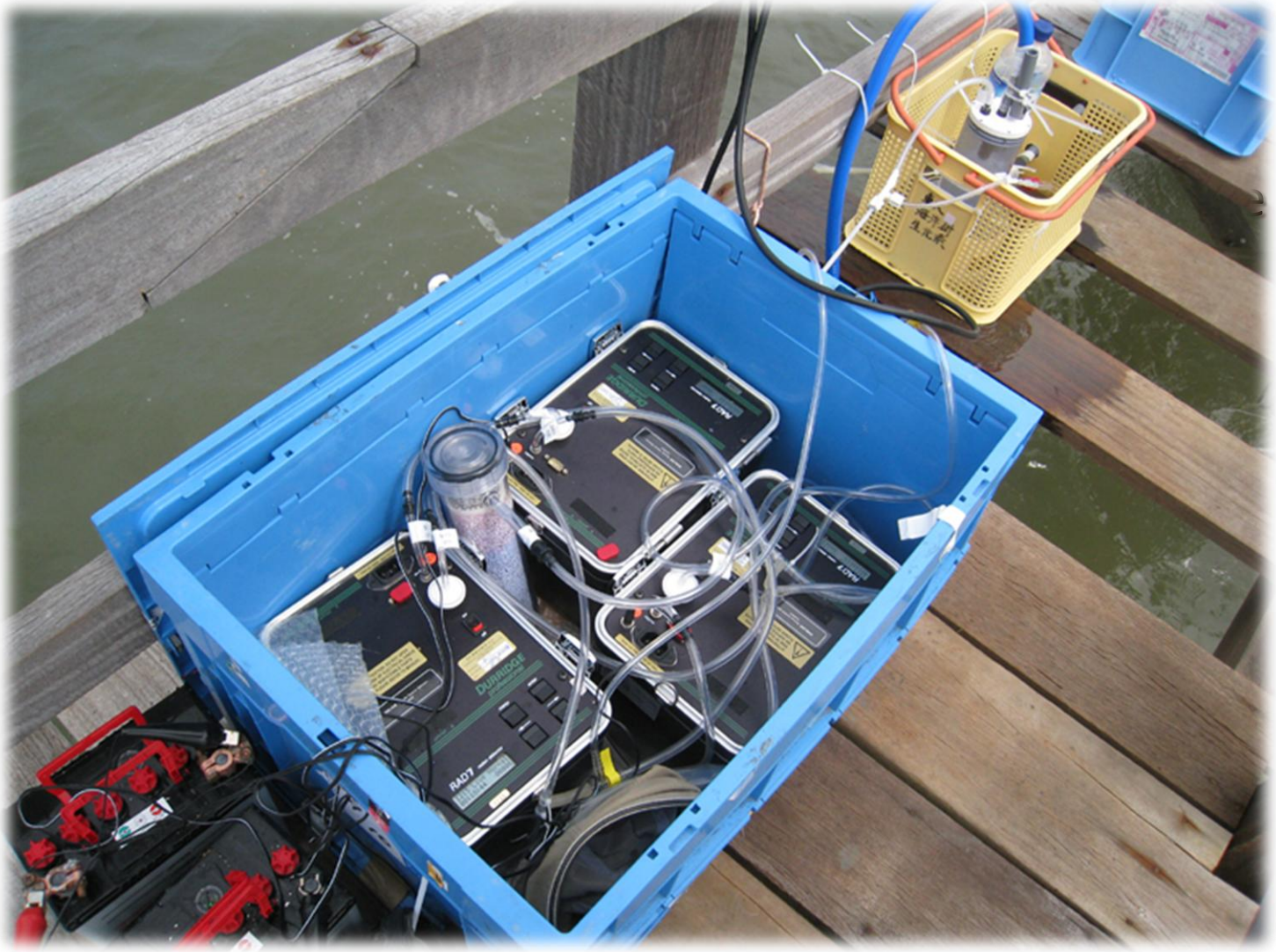


Study Site

Spatial monitoring of Rn-222

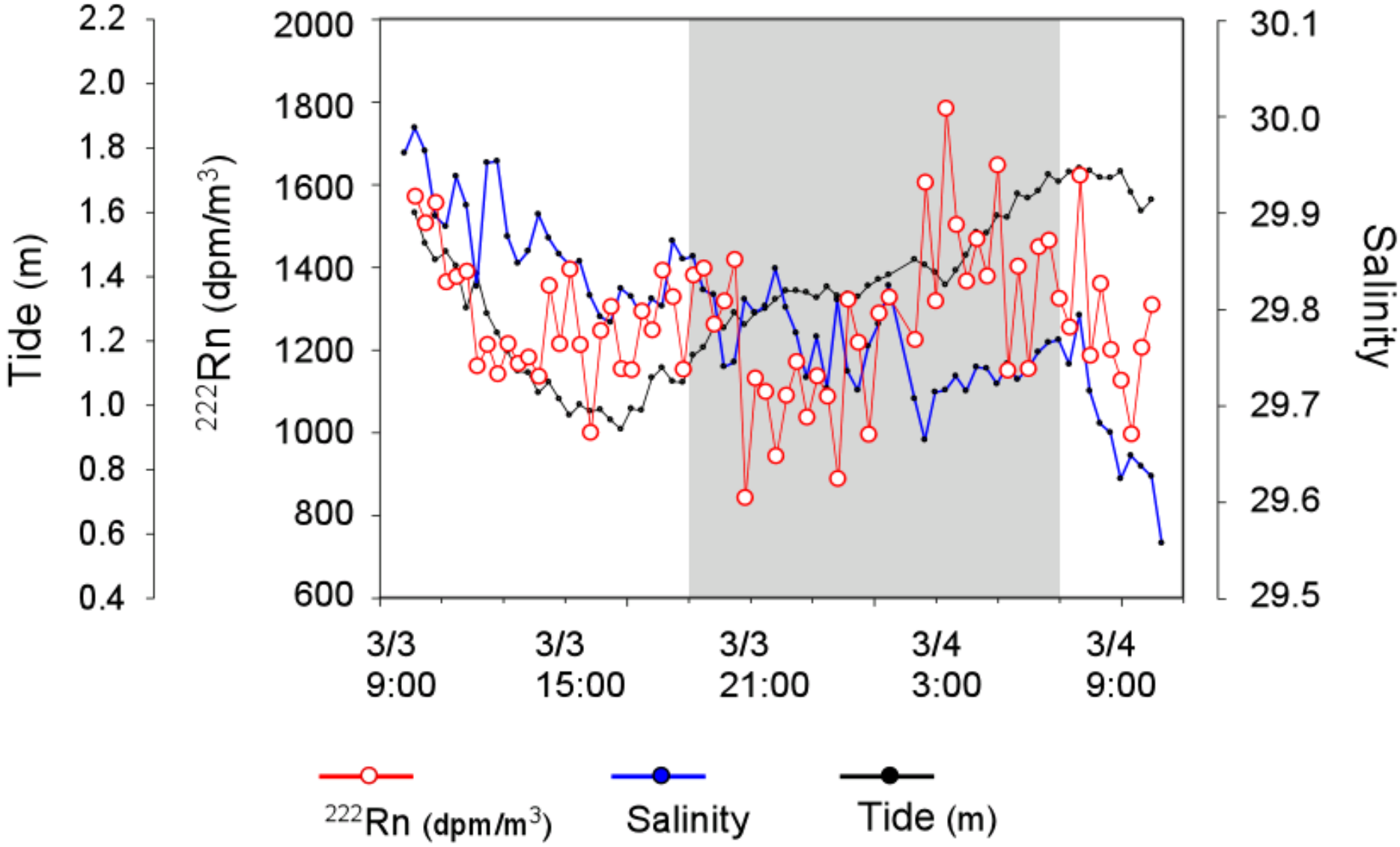


Spatial and temporal monitoring of Rn-222 along coastal area of Jakarta city



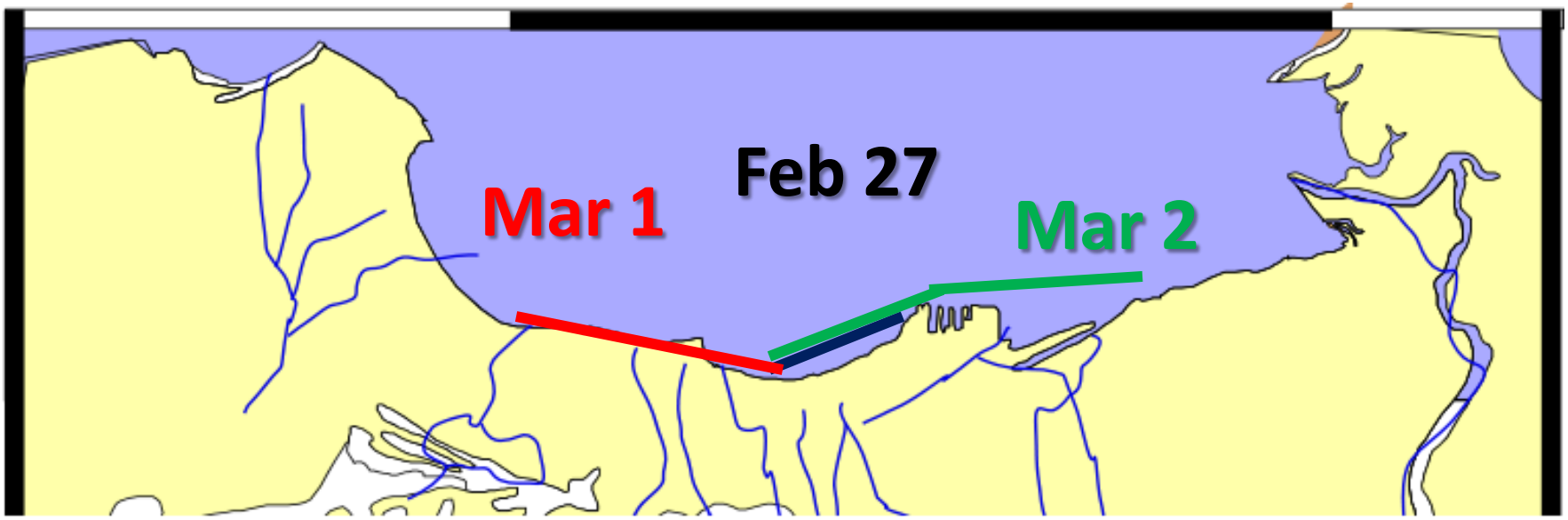
Dulaiova et al. (2005)

Time series variation of Rn-222 in coastal seawater at the surveyed beach



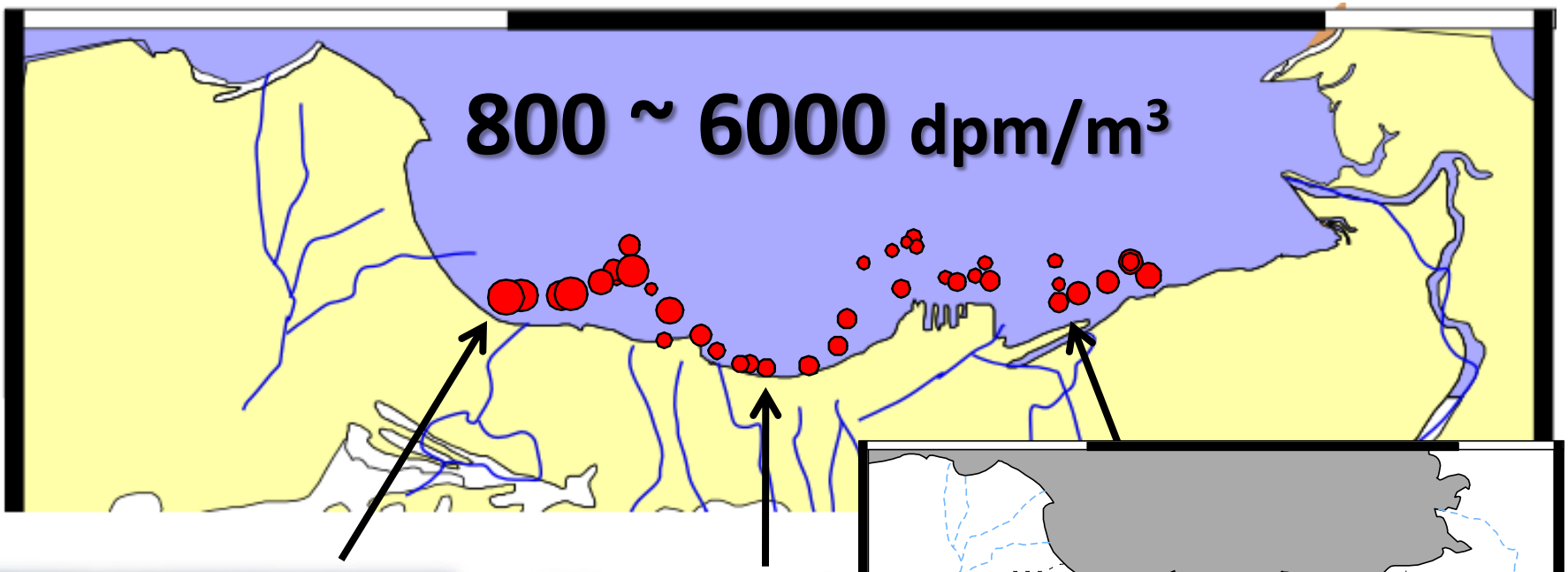
Study Site

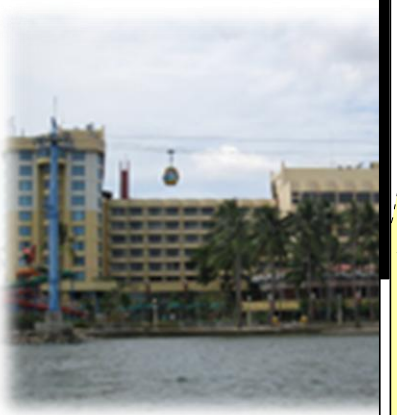
Spatial monitoring of Rn-222

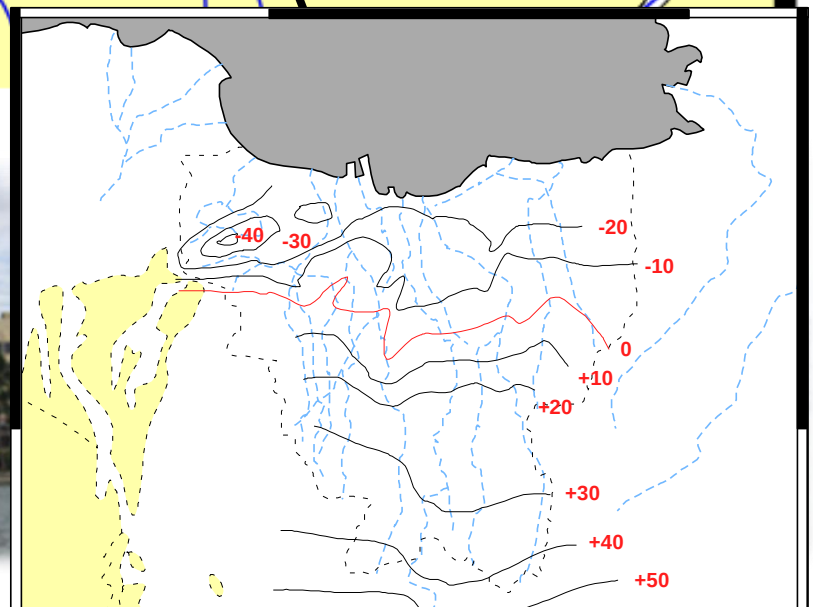


Spatial monitoring of Rn-222

Attention: Correction of the effects of tidal change on Rn has yet to be conducted. This is just raw data.







Brief conclusion

- Rn concentration in groundwater were pretty high. So we can effectively use Rn as indicator of groundwater discharge along coastal areas.
- Continuous Rn monitoring at coastal areas suggested us that groundwater discharge can be low at city areas. In suburban areas, however, it is higher than that in city areas.
- Further studies should be conducted.

Future plan & tasks

- Time-series monitoring at western area where is natural mangrove areas, and ^{222}Rn concentration change can be monitored along tidal shift.
- Time-series monitoring in long period (a few days to 1week) should be needed to check the effects of several factors, such as tide, wind and precipitation.
- Collect much more groundwater and river water samples to check the variation of Rn concentrations as endmember.
- We would appreciate it if we could collaborate with local oceanographers, who are familiar with residence time of seawater and its circulation in Jakarta Bay.
- Climate data (wind etc.) at local observatory is needed!